SECRET

PROPOSAL FOR A USIB SPONSORED RESEARCH INSTITUTE FOR INTELLIGENCE INFORMATION HANDLING

Contents

Attachments

SECRET

PROPOSAL FOR A USIB SPONSORED RESEARCH INSTITUTE FOR INTELLIGENCE INFORMATION HANDLING

I. General Summary of the Proposal

An Institute should be established, under USIB ~~guidance~~ guidelines which would, to conduct a research and development (R/D) program ~~to~~ serve the entire intelligence community. The proposed Institute should have independent direction, facilities, staffing, and funding. The program will be concerned with the anticipated R&D requirements/needs of the intelligence community and emphasize research on the future problems, in contrast to engineering development for solving immediate operational requirements.

The Institute is not intended to duplicate any research and development effort which the intelligence agencies conduct to fulfill their mission requirements. The Institute will conduct all basic and exploratory research and development for intelligence as specified in an appropriate charter and will be responsive to such research and development requirements in information handling which the separate intelligence agencies cannot conduct adequately with their own resources.

II. The Needs for a Research Institute

The IHC/R&D Subcommittee believes that it is not necessary to reestablish the need for research and development in information handling. A great deal of attention has been given to this question in the past in association with PFIAB recommendations, the SCIPS Project, CODIB activities, and other similar activities. Studies of needs for this type of Institute have been conducted by DIA and Navy.

These studies have resulted in reports which strongly recommend the establishment of a research institute similar to this institute proposal. PFIAB has expressed concern over the lack of this type of facility for the intelligence communtiy.

It is the consensus of the IHC/R&D Subcommittee that progress in the application and use of newly-available technology for processing and analysis in intelligence is lagging. Support for information processing research and development in the intelligence community has been seriously cut in recent years and much of the so-called research and development that is conducted is direct aid in support of operations. The work that is being conducted at present is greatly fragmented and inadequate to deal with the systems problems which are extremely complex and cover a multiplicity of disciplines.

Research and development is conducted to provide for future needs of an organization. While intelligence processing loads are increasing, and resources are being cut back, costs of non-automated processes are increasing and costs of automated processes are decreasing, it is essential that a vigorous and viable research and development program on intelligence processing problems be maintained. Under the existing situation, programs, staffing, and funds are inadequate and the Research Institute is proposed as the most desirable course to be adopted to achieve a significant research and development program and make the best use of available resources.

Further discussion about the need for an Institute and the relationship between research and operations is given in Attachment A.

III. Charter, Organization and Direction

The Institute will be organized and established under a charter to be approved by the Director, Central Intelligence with the concurrence of the USIB. The charter will detail the guidelines under which the Institute will operate, the program goals, and the relationships and responsibilities of (1) the Institute to the intelligence community and (2) the intelligence community to the Institute. It is proposed that the Institute be constituted as a component of an agency/department of the existing intelligence community which will serve as the Executive Agency. The Executive Agency will be assigned as part of the Institute Charter action which will be approved by the DCI with the concurrence of THE USIB. The Institute will make use of the funding and support mechanisms of the Executive Agency. The Director of the Institute will report to the Director of the Executive Agency within the guidelines designated in the charter. It is essential that the program for the Institute be managed and directed by a single individual who has the highest possible qualifications. The charter will contain particulars specifying that the Director of the Institute will have full responsibility for the initiation, management and direction of the Institute's program and the selection of the Institute staff. The Director of the Institute will be recommended by the IHC and approved by the Director of Central Intelligence with the concurrence of the USIB. (See Attachment B)

In addition to the provisions stated above, an important additional action required in setting up the proposed Institute is the

formation of a management body which will be responsible for the supervision of the interaction between the Institute and the operational components of the intelligence community. This management body will be attached to the NIPE Staff. It will be the function of this management body to (1) receive the findings and recommendations of the Research Institute, and (2) receive on a regular basis the specific requirements and needs of the members of the intelligence community. It will act on a continuing basis under the direction of the Director, Central Intelligence to insure that all possible steps are taken to apply the findings of the Institute in operational situations, and to see that the Institute is responsive to needs of the intelligence community. It will insure that priorities are established which will serve as guidelines in the allocation of available resources and the determination of budgetary levels for the application of new information-handling methods as pertaining to the program of the Research Institute.

The charter will provide for the appointment and functioning of a Science Advisory Board to give assistance to the Director of the Institute. The members of the Scientific Advisory Board will be recommended by the IHC and approved by the DCI with the concurrence of the USIB. The Scientific Advisory Board will report to the Director of the Institute. Attachment C illustrates the proposed relationships between the Institute and organizations in the intelligence community.

IV. Program

While the Institute will be broad in scope, its program will be focused on the future operational community problems. The program will emphasize basic and exploratory research, rather than engineering development, for unstated operational requirements and will normally be concerned with problems in information handling related to future needs. The program will include research and development tasks that are assigned by the intelligence community as described in the guidelines established in the Charter and according to priorities as determined by the Research Institute management body assigned to the DCI's National Intelligence Programs Evaluation Staff (NIPE). The professional staff of the Institute will be of highest competence in the many disciplines which are important for information processing and analysis problems. A particularly strong staff emphasis will be made in the information, mathematical, engineering, and system sciences and aspects of the communication and computing technology. It should be emphasized that problems in information handling are not only concerned with machines and machine processes. A major area for attention would be man-machine interactions, including techniques which will assist the intelligence officer or analyst in prediction, inference, evaluation, policy-making ~~or decision-making~~.

The Institute staff will serve as a continuing resource to be used and consulted by the intelligence community on all types of information processing and analysis.

The Institute will require a staff of approximately [redacted] persons to fulfill its mission. It is proposed that additional professional personnel be assigned on a rotational basis to the Institute from ~~the member agencies of~~ the intelligence community. These rotational personnel will be assigned to the Institute for a minimum of two consecutive years and will report to the Director of the Institute during this period. The Charter shall include provisions for the permanent Institute Staff to serve a specified tour in the various portions of the intelligence community. 25X1

A full-scale computer facility will be maintained for the use of the Institute. Specialized machine equipment will be provided to perform R&D on all types of intelligence data including digital, analog, graphic, and textual. With a competent staff significant research and development will be conducted in-house with an expectation of good efficiency and significant results after a reasonable build-up period for the Institute. To achieve the objectives and schedules which are desired the in-house effort will be supplemented and supported by contract research and development. This contract research and development will be initiated and supervised by the Institute staff.

A program plan for the Institute will clearly emphasize the introduction of such innovative techniques as would relieve or eliminate identified problems in the intelligence community. This means there would be research and development performed which is not in direct support of present intelligence processes and

operations. However, all elements of the program shall have a clear relation to existing problems. As is indicated elsewhere in this proposal, the Institute will take initiative in basic and exploratory research; however, it will also carry out such systems development, systems tests, advanced development or engineering development on related projects as tasked by the intelligence community within the limitations of its resources.

Illustrative examples of potential task areas which might be included in the Institute program are given in Attachment D.

V. Relation to the Intelligence Community

The Institute program will be subject to the general guidelines indicated in the charter and in this way will be generally responsive to community requirements. It will be most desirable that contact and interaction between the Institute and the community not be forced activity, but that it come about because of the obviously attractive and useful results and achievements of the Institute. The plan to fill a portion of the staff requirements of the Institute with personnel from the intelligence community will do much to keep a close relationship between the Institute and the community which it serves.

In addition to undirected interaction, it is essential that there be systematic mechanisms to see that problems, requirements, opportunities and options are examined and addressed in an ordered way and for this purpose the functioning of the information handling management body (discussed in Section III above) has been proposed.

It is essential that a mechanism be established so that agencies can present specific matters on stated research and development requirements for Institute consideration and action as a part of the annual programming and budgeting process.

VI. Relation to the Scientific and Academic Community

The Charter will provide that a Science Advisory Board be established to give assistance in the direction of the Institute and to serve as a principal link with the scientific community. ~~It is proposed that~~ The Science Advisory Board WILL consist of nationally known individuals of highest competence in the scientific fields relating directly to intelligence information handling methods and processES.

The Science Advisory Board will serve primarily to assist the Director of the Institute in reviewing program plans and activities in basic and exploratory research and evaluating results achieved.

VII. Funding

The level of funding required to support an Institute of the scope described in this proposal should be in the range of [redacted] 25X1

25X1 [redacted] per year. A minimal program to implement the Institute should plan for a build-up to the [redacted] 25X1

25X1 [redacted] level in a three-year period with a budget of [redacted] the first year and [redacted] for the second year.

Apart from the level of funding, a most important matter for

25X1 a research and development organization is stability and continuity. Provision should be made that there are no sudden gyrations in funding level from year to year. The information handling

management body (attached to NIPE) will function to insure that balance and stability are maintained in support levels and that provision is made for adequate support of high-priority projects. This body will not only determine specific priorities within the intelligence community for the Institute program, it will also perform as principal liaison with the Bureau of the Budget in establishing funding priorities in the intelligence information handling research and development area for the Institute.

It is essential that the budget for the Institute be carried as a line item as designated by the Charter. 25X1

It is recommended that costs to carry out implementation be absorbed as part of the IHC Support Staff effort for fiscal year 1971. If a decision is made to proceed with the plan it is recommended that a specific entry be made in the DCI's budget plans to cover Institute funding requirements as follows:

VIII. Proposed Implementation Plan

It is recommended that action to implement the plan for the Institute go forward in separate phases. After a decision is made to proceed with the plan, a first phase would require the writing of the Institute Charter by the IHC/R&D Subcommittee and the selection and assignment of an Executive Agency. A second phase involving the appointment of the Institute director, selection of the Science Advisory Board and preliminary planning of an Institute program could probably be accomplished in a 9-month period. In a third

phase, involving a 12-month period, organization of the Institute, recruitment of staff, procurement of facilities, and detailing and approval of the Institute program could be accomplished. In a fourth phase, extending over a 2-year period, the Institute could be expanded to a full program level. If Phase I could begin 1 July 1970, Phase I and II could be completed in FY71, Phase III in F&72, and Phase IV in FY73 and FY74. A summary outline of the implementation plan is given in Attachment 5.

Attachment A

WHY A RESEARCH INSTITUTE FOR INFORMATION HANDLING IS NEEDED

Research and development programs have suffered because of a lack of continuity and stability, as well as a lack of sufficient funding, support, facilities, and a fragmentation of needed effort. This has been a principal factor in the problem of staffing agency components with professional personnel of sufficient competence. An Institute will be established with a stable and continuing program which will provide opportunity for outstanding professionals to develop. The capturing and retaining of highly competent technical people in the information handling field is a critical requirement for the intelligence community. An Institute can satisfy this requirement, which is not being met at the present time.

A series of memorandums and documents are available to show that there is a strong consensus that more research and development needs to be performed. It is important that suitable mechanisms be set up within the existing intelligence organizational structures to facilitate the determination of what research and development is to be conducted, what priorities shall be established, and how the research and development tasks are to be conducted.

A way can be found to set up a suitable mechanism which can assist in making possible a balanced and viable research and development effort to meet the community needs. In order to clarify what mechanisms are desirable, it is essential that the role and responsibilities of research and development be clearly distin-

Attachment A - (cont.)

guished from those of operations. As shown in Figure 1, there are a series of steps in the process leading from research and development to operations. Basic research is performed to determine the nature and characteristics of problems. In a next step, exploratory research and development is conducted to determine possible and feasible solutions to problems. Advanced development is a following step where solutions are determined which will satisfy a particular requirement in operations. Where a class of operational requirements are identified, engineering development is conducted in an operational context. Finally, systems operations are maintained with optimum efficiency and effectiveness in order to fulfill particular operational missions and tasks.

Research and development has a major role in steps 1 and 2 of those given in Figure 1. Operations has the major role in steps 3 and 4 and has the entire role in step 5 where a major consideration is the use and allocation of available resources to perform specified operational tasks and missions effectively. Note that the roles and objectives of research and development and operations are different. In the past a major cause of difficulty in promoting research and development in the intelligence community is that research and development is mixed in with operations in an organization. Research and development has been subjected to direction imposed by operational considerations and management. Pressures are brought to bear on research and development largely for short-term immediate needs. This embedding of research and

development has been the principal source of difficulties. Any useful mechanism for the future must provide a degree of freedom for the management of research and development so that it can set the directions for its programs. At the same time, research and development capabilities must be set up in a way that insures its intimate contact and interaction with operations which has its own but different requirements.

In addition to the separation of research and development from operations, there must still be the dynamic contact and interaction between research and development and operations. It is of essential importance that (1) this interaction be managed at the top-level of the intelligence community, (2) mechanisms be set up to see that priorities are established, (3) action is initiated so that results of research and development are applied, and (4) the needs and requirements of operations are met responsively. Some of the relationships discussed above are indicated in Figure 2.

Attachment A - Figure 1

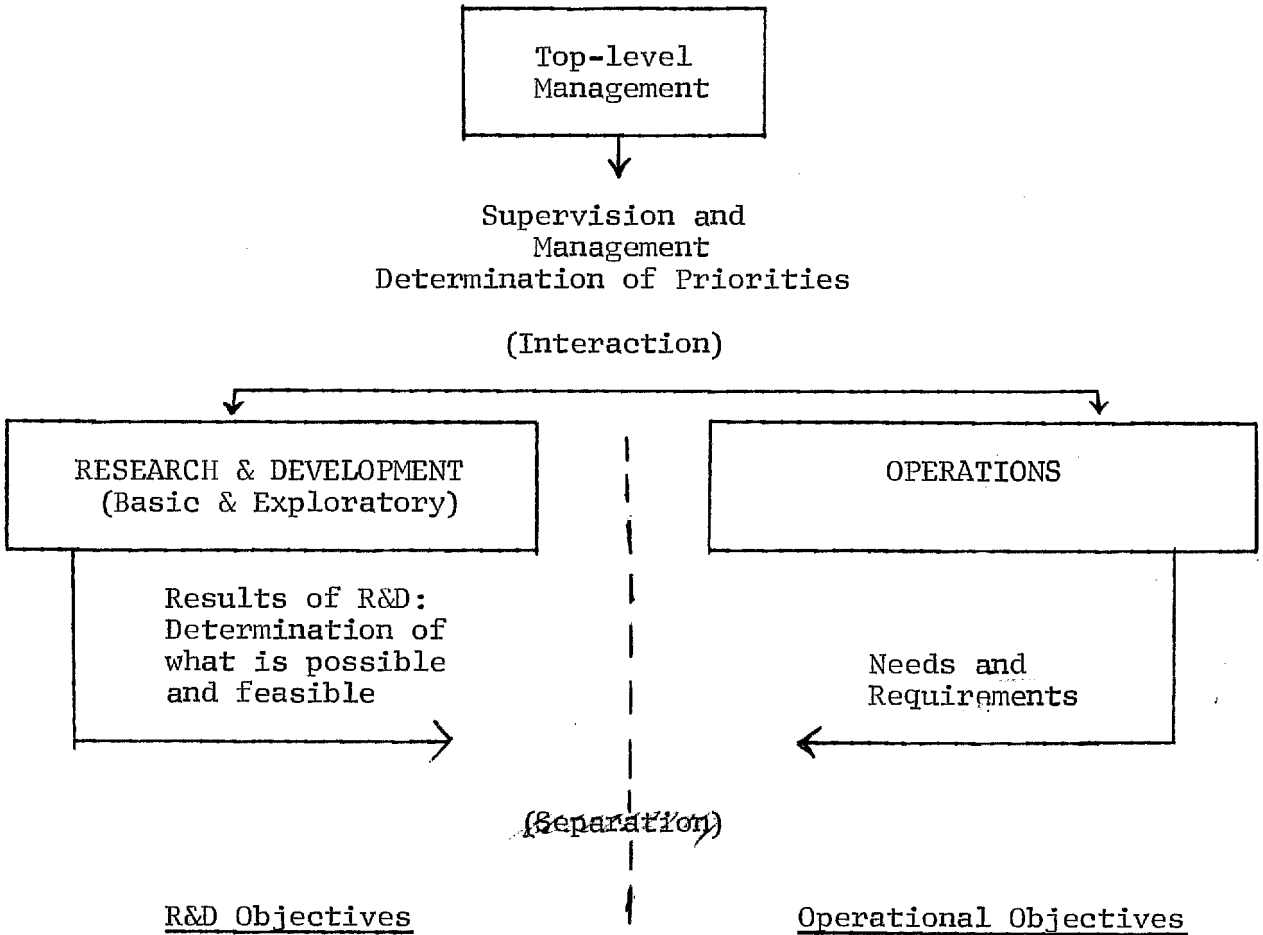
STEPS IN THE PROCESS

LEADING FROM ~~AN~~ R&D TO AN OPERATIONAL MODE

	Goals
1. BASIC RESEARCH	Determine what is the nature of the problem
↓	
2. EXPLORATORY RESEARCH AND DEVELOPMENT	Determine what solutions to problems are possible and feasible
↓	
3. ADVANCED DEVELOPMENT	Determine satisfactory solutions for an identified operational requirement
↓	
4. ENGINEERING DEVELOPMENT	Determine satisfactory solutions for a class of identified operational requirements
↓	
5. SYSTEMS OPERATION	Operate systems with optimum efficiency and effectiveness to satisfy specified missions

Attachment A - Figure 2

RELATIONS BETWEEN R&D AND OPERATIONS



R&D Objectives

Determine nature of problems and solutions; utilize all available new knowledge and resources to provide guidance on better means to satisfy operational needs and requirements.

Operational Objectives

Operate and manage resources to fulfill missions with optimum effectiveness and efficiency.

Attachment B

SUMMARY OF PROPOSED RELATIONSHIPS AND RESPONSIBILITIES

A. Director of Institute

Recommended by IHC
Approved by the DCI with the concurrence of USIB

Reports to: Director of Executive Agency

B. Scientific Advisory Board

Recommended by IHC
Approved by the DCI with the concurrence of USIB

Reports to: Director of Institute

C. Executive Agency

Recommended by IHC
Assignment made in the Research Institute Charter
Approved by the DCI with the concurrence of USIB

D. Information-Handling Management Body for the Research Institute

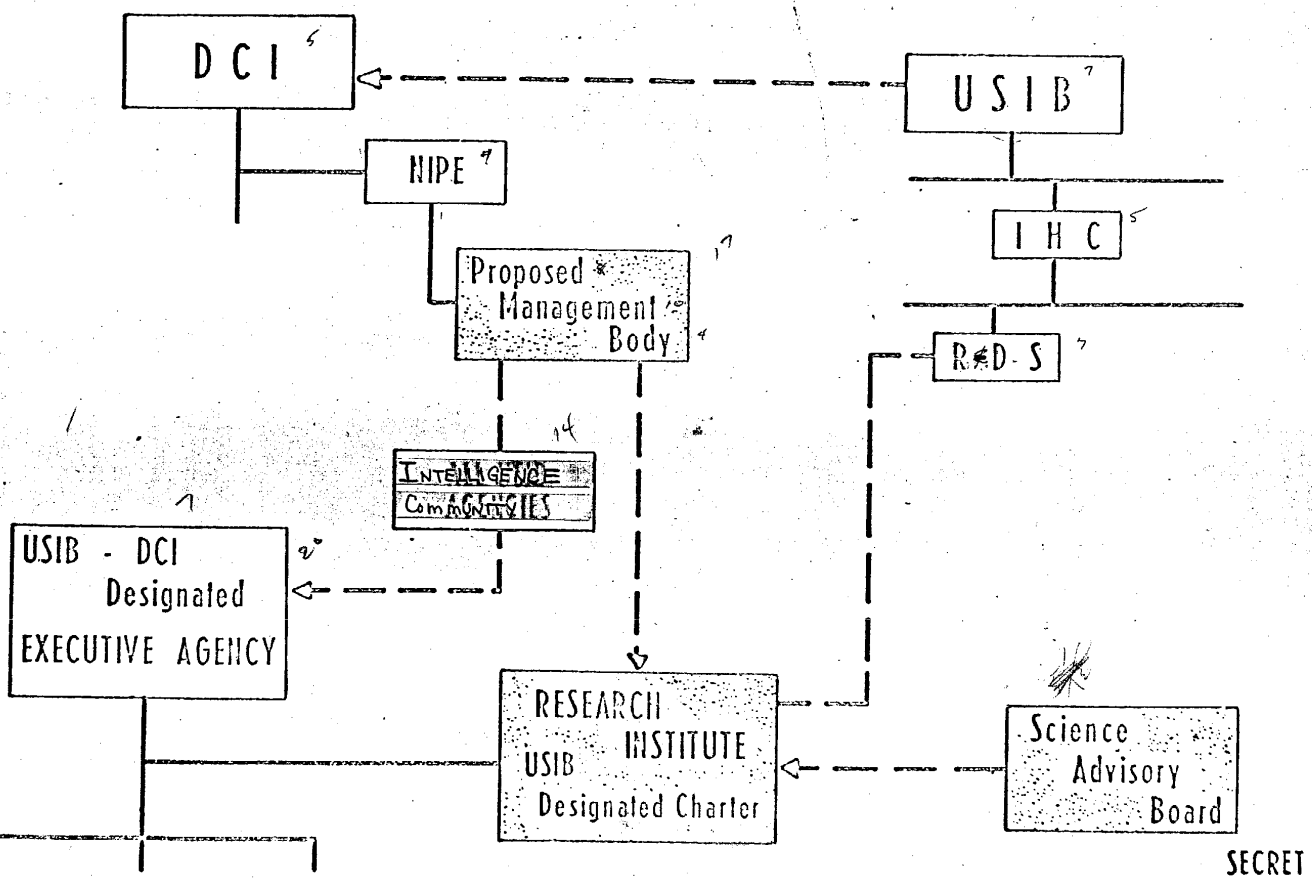
Established by Research Institute Charter
Approved by the DCI with the concurrence of USIB

Reports to: D/NIPE

Relation of Research Institute to the Intelligence Community

Relation of Research Institute to the Intelligence Community

Attachment C



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Attachment D

ILLUSTRATIVE EXAMPLES OF POTENTIAL TASK AREAS

Design, development and testing of security controls for multi-LEVEL REMOTE access computer systems.

Design, development and testing of improved methods for speech processing, speech recognition, optimization of speech intelligibility, speech synthesis, AND speech output.

Determination of cost-effectiveness of alternative procedures, processes and systems.

Design and development of improved methods for structuring, organizing, updating, consulting and managing very large data bases.

Research, development and testing on improved methods for indexing, content representation, gisting, abstracting and summarizing.

Design, development and testing of improved methods for retrieval, searching and correlation of intelligence data.

Design, development and testing of improved methods for input processing of data for machine systems (character recognition methods, source data automation, etc.)

Testing and evaluation of general data management systems.

Design and testing of resource sharing and distributed processing networks.

Determination of feasibility of interactive processes for analysis and interpretation of intelligence data.

Design, development and testing of predictive and inference processes which are applicable to intelligence data.

Studies of the impact of new knowledge and technology on present and proposed procedures, systems and processes.

Design and testing of methods for associative processing and exploitation of relational data files.

Attachment D

ILLUSTRATIVE EXAMPLES OF POTENTIAL TASK AREAS (cont.)

Design, development and testing of improved processes for analysis of graphic intelligence data, AND graphic pattern recognition.

Design, development and testing of improved processes for analysis of analog signals, recovery of signals from noise, automated signal recognition, interactive display analysis, etc.

Design, development and testing of systems for correlation of multiple source data.

Design and testing of high speed mass memories, domain memories, ETC.

Design and test new processes and systems by the application of statistical decision theory, mathematical modeling and operations analysis techniques.

Design, development and experimental testing of machine aids for policy and decision-making processes.

S E C R E T

Attachment E

USIB SPONSORED RESEARCH INSTITUTE

OUTLINE OF IMPLEMENTATION PLAN

Phase	Completion Date	Implementation Task
I	A-day + 3 months	Writing and adoption of Institute charter Selection and assignment of Executive Agency
II	A-day + 12 months	Selection and appointment of Institute Director Selection and appointment of Science Advisory Board Preliminary planning and implementation of Institute program with support from Executive Agency
III	A-day + 24 months	Organization of Institute Recruitment of staff Detailing and approval of Institute program Procurement of facilities
IV	A-day + 24 to 48 months	Operation and expansion to a full program level in approximately a 2-year period
V	A-day + 48 months	Operation at full program level

NOTE: A-day is the day that approval is obtained from the DCI with the concurrence of USIB.

S E C R E T

WORKING PAPER

R&D File Copy

OBJECTIVES

1. Perform R/D in information handling in support of more than one agency or department which may not be performed otherwise due to a difficulty of funding and project planning. An example may be an experimental trial service of the picturephone type of serve between the chief executive offices of CIA, DIA, NSA, State, DoD and White House. The picturephone service would offer visual and oral communications between these locations, as well as display information from data banks (i.e., regularly scheduled intelligence briefings at multi-locations, intelligence summaries, instantaneous executive discussions during crisis, while the executives remain at their mutual "data bases").

Another example would be to provide R/D for a network of computer and communications for improved flow of increased information to special centers such as ISIC, NIC, WHSR from the total community.

OBJECTIVES

2. Perform R/D on large projects which are too expensive to be supported by a single agency/department.

An example would be an experiment on extremely large file (10^{12}- 10^{20} characters) management techniques. Tradeoffs in the various storage, indexing, retrieval, updating, and data correlation techniques could be evaluated.

OBJECTIVES (Cont)

3. Perform R/D on specific intelligence techniques of interest to the intelligence community, but not of interest to a single agency/department, such that they will support it.

STAT

[redacted]

OBJECTIVES

4. Perform R/D where consolidation of R/D requirements would reduce the cost and/or improve the usefulness and standardizations of an end product.

An example may be the design of a low cost display terminal for maximum acceptance and use by any intelligence analyst.

5. OBJECTIVES

Perform R/D on prototype installations in operational environment, which would not or could not be sponsored otherwise.

An example may be a new method of providing computer security on large systems.

21 August 1969

Some Potential Advantages

1. Provide atmosphere, laboratory, and administrative procedures for testing of new community concepts.
2. Provide R&D in resource sharing (software, processes, and data bases).
3. R&D can be performed which is not limited to the operational needs or support of a single agency or department, but have knowledge available when needed.
4. Provide forum and focus for community discussion of problems.
5. Improve exploitation of new technology in information sciences in private industry.
6. Reduce frustrations of "on and off" funding.
7. Improved stability and motivation, with less "red" tape, would increase availability of experts.
8. Provide leadership in information handling in intelligence community.
9. Provide increased common pooling of laboratories and computers.
10. Reduce jurisdictional boundaries for improved exchange of technical information (which would reduce gaps).
11. Increase "real" research in direct support of intelligence community.
12. Increased coupling with scientific community due to increased visual image and mission.
13. Working hours could be flexible to accomplish the job.
14. Freedom to explore new ideas.

15. Improved staff support not limited by billets.

16. More freedom for visitors to discuss their new technology.

17. Travel regulations and restrictions relaxed.

continued on next sheet

Some Potential Advantages

18. A large team could go "critical" and lead, rather than monitor.
19. Could have improved technical library for users.
20. Provide more liberal policy on attendance at conferences and meetings.
21. Procurement system could be faster and more effective.
22. Publish in open literature which will aid in recruitment and maintaining best experts.
23. Rotation of personnel would broaden outlook and improve understanding of staff.

OTHER POTENTIAL CONSIDERATIONS

Could receive non-agency or department funding from BoB, directly.

Endorsement by PFIAB

Institutes or captive corporations are used by intelligency communities.

POTENTIAL TASKS

1. Interactive man machine interface
2. High speed mass memory
3. Exploration of microprogramming
4. File management on very large data base
5. Low cost computer display
6. Computer security
7. Indexing of information
8. Content representation in computers
9. Speech
10. Source data automation
11. Develop methods for obtaining information on one subject from many sources
12. Develop update techniques on multiple files with update actions being performed at one central point.